

Ch1 Xavier Viennot

From the first time she picked up a softball bat, Kayla has loved team games of any stripe. Now in her mid-forties, though, she is starting to come to the bitter realization that like all good things, her involvement in team sports must come to an end one day, whether she's ready or not. When her broomball teammates start making noises about this being their final season together, Kayla sets her sights on capturing the league championship. What better way to remind them of how much fun it can be to win? The prospect of snagging the league title seems brighter with the addition of a new player, Val, who Kayla would like to get to know better. That is, if her meddlesome ex Abby will stay out of the picture long enough. Will winning the championship be enough to bring Kayla's teammates back for one more season? If not, what can she do about it?

Written for graduate students in mathematics or non-specialist mathematicians who wish to learn the basics about some of the most important current research in the field, this book provides an intensive, yet accessible, introduction to the subject of algebraic combinatorics. After recalling basic notions of combinatorics, representation theory, and some commutative algebra, the main material provides links between the study of coinvariant—or diagonally coinvariant—spaces and the study of Macdonald polynomials and related operators. This gives rise to a large number of combinatorial questions relating to objects counted by familiar numbers such as the factorials, Catalan numbers, and the number of Cayley trees or parking functions. The author offers ideas for extending the theory to other families of finite Coxeter groups, besides permutation groups.

In 1875, Elwin Bruno Christoffel introduced a special class of words on a binary alphabet linked to continued fractions which would go onto be known as Christoffel words. Some years later, Andrey Markoff published his famous theory, the now called Markoff theory. It characterized certain quadratic forms and certain real numbers by extremal inequalities. Both classes are constructed using certain natural numbers known as Markoff numbers and they are characterized by a certain Diophantine equality. More basically, they are constructed using certain words essentially the Christoffel words. The link between Christoffel words and the theory of Markoff was noted by Ferdinand Frobenius in 1913, but has been neglected in recent times. Motivated by this overlooked connection, this book looks to expand on the relationship between these two areas. Part 1 focuses on the classical theory of Markoff, while Part II explores the more advanced and recent results of the theory of Christoffel words.

This book highlights the latest advances in algebraic topology, from homotopy theory, braid groups, configuration spaces and toric topology, to transformation groups and the adjoining area of knot theory. It consists of well-written original research papers and survey articles by subject experts, most of which were presented at the "7th East Asian Conference on Algebraic Topology" held at the Indian Institute of Science Education and Research (IISER), Mohali, Punjab, India, from December 1 to 6, 2017. Algebraic topology is a broad area of mathematics that has seen enormous developments over the past decade, and as such this book is a valuable resource for graduate students and researchers working in the field.

The Beauty of Fractals includes six essays related to fractals, with perspectives different enough to give you a taste of the breadth of the subject. Each essay is self-contained and expository. Moreover, each of the essays is intended to be accessible to a broad audience that includes college teachers, high school teachers, advanced undergraduate students, and others who wish to learn or teach about topics in fractals that are not regularly in textbooks on fractals.

How can a robot decide what motions to perform in order to achieve tasks in the physical world? Robot motion planning encompasses several different disciplines, most notably robotics, computer science, control theory and mathematics. This volume presents an interdisciplinary account of recent developments in the field. Topics covered include: combining geometric algorithms and control techniques to account for the nonholonomic constraints of most mobile robots; the mathematical machinery necessary for understanding nonholonomic systems; applying optimal techniques to compute optimal paths; feedback control for nonholonomic mobile robots; probabilistic algorithms and new motion planning approaches; and a survey of recent techniques for dealing with collision detection.

Examines key technological innovations, knowledge transfer, connectivity and social meaning in the ancient and Medieval Sahara.

Devastating losses caused by diseases such as smallpox led to an epidemic of bereavement among the Natives. This loss resonated with the French, who had dealt with smaller epidemics in France and were also mourning their absent communities through a nostalgia for home.

Blum traces how ghosts provided transgenerational and transcultural links that guided understanding rather than encouraging violence. Ghost Brothers insightfully examines the process of this colonial interdependent alliance between Native and European worlds.

This book examines a range of visual images of military recruitment to explore changing notions of glory, or of gloire, during the French Revolution. It raises questions about how this event re-orientated notions of 'citizenship' and of service to 'la Patrie'. The opening lines of the Marseillaise are grandly declamatory: Allons enfants de la Patrie/le jour de gloire est arrivé! or, in English: Arise, children of the Homeland/The day of glory has arrived! What do these words mean in their later eighteenth-century French context? What was gloire and how was it changed by the revolutionary process?

This military song, later adopted as the national anthem, represents a deceptively unifying moment of collective engagement in the making of the modern French nation. Valerie Mainz questions this through a close study of visual imagery dealing with the issue of military recruitment. From neoclassical painting to popular prints, such images typically dealt with the shift from civilian to soldier, focusing on how men, and not women, were called to serve the Homeland.

Explains the adoption, diffusion of, and resistance to gender quotas in politics, corporate boards and public administration across Europe.

This volume presents proceedings from the 19th IFIP World Computer Congress in Santiago, Chile. The proceedings of the World Computer Congress are a product of the gathering of 2,000 delegates from more than 70 countries to discuss a myriad of topics in the ICT domain. Of particular note, this marks the first time that a World Computer Congress has been held in a Latin American country. Topics in this series include: The 4th International Conference on Theoretical Computer Science Education for the 21st Century- Impact of ICT and Digital Resources Mobile and Wireless Communication Networks Ad-Hoc Networking Network Control and Engineering for QoS, Security, and Mobility The Past and Future of Information Systems: 1976-2006 and Beyond History of Computing and Education Biologically Inspired Cooperative Computing Artificial Intelligence in Theory and Practice Applications in Artificial Intelligence Advanced Software Engineering: Expanding the Frontiers of Software For a complete list of the more than 300 titles in the IFIP Series, visit springer.com. For more information about IFIP, please visit ifip.org.

This volume of research papers comprises the proceedings of the first International Conference on Mathematics of Neural Networks and Applications (MANNA), which was held at Lady Margaret Hall, Oxford from July 3rd to 7th, 1995 and attended by 116 people. The meeting was strongly supported and, in addition to a stimulating academic programme,

it featured a delightful venue, excellent food and accommodation, a full social programme and fine weather - all of which made for a very enjoyable week. This was the first meeting with this title and it was run under the auspices of the Universities of Huddersfield and Brighton, with sponsorship from the US Air Force (European Office of Aerospace Research and Development) and the London Mathematical Society. This enabled a very interesting and wide-ranging conference programme to be offered. We sincerely thank all these organisations, USAF-EOARD, LMS, and Universities of Huddersfield and Brighton for their invaluable support. The conference organisers were John Mason (Huddersfield) and Steve Ellacott (Brighton), supported by a programme committee consisting of Nigel Allinson (UMIST), Norman Biggs (London School of Economics), Chris Bishop (Aston), David Lowe (Aston), Patrick Parks (Oxford), John Taylor (King's College, London) and Kevin Warwick (Reading). The local organiser from Huddersfield was Ros Hawkins, who took responsibility for much of the administration with great efficiency and energy. The Lady Margaret Hall organisation was led by their bursar, Jeanette Griffiths, who ensured that the week was very smoothly run.

Algebraic Combinatorics and Coinvariant Spaces CRC Press

This book discusses the representation theory of symmetric groups, the theory of symmetric functions and the polynomial representation theory of general linear groups. The first chapter provides a detailed account of necessary representation-theoretic background. An important highlight of this book is an innovative treatment of the Robinson–Schensted–Knuth correspondence and its dual by extending Viennot's geometric ideas. Another unique feature is an exposition of the relationship between these correspondences, the representation theory of symmetric groups and alternating groups and the theory of symmetric functions. Schur algebras are introduced very naturally as algebras of distributions on general linear groups. The treatment of Schur–Weyl duality reveals the directness and simplicity of Schur's original treatment of the subject. In addition, each exercise is assigned a difficulty level to test readers' learning. Solutions and hints to most of the exercises are provided at the end.

Big data is presenting challenges to cybersecurity. For an example, the Internet of Things (IoT) will reportedly soon generate a staggering 400 zettabytes (ZB) of data a year. Self-driving cars are predicted to churn out 4000 GB of data per hour of driving. Big data analytics, as an emerging analytical technology, offers the capability to collect, store, process, and visualize these vast amounts of data. Big Data Analytics in Cybersecurity examines security challenges surrounding big data and provides actionable insights that can be used to improve the current practices of network operators and administrators. Applying big data analytics in cybersecurity is critical. By exploiting data from the networks and computers, analysts can discover useful network information from data. Decision makers can make more informative decisions by using this analysis, including what actions need to be performed, and improvement recommendations to policies, guidelines, procedures, tools, and other aspects of the network processes. Bringing together experts from academia, government laboratories, and industry, the book provides insight to both new and more experienced security professionals, as well as data analytics professionals who have varying levels of cybersecurity expertise. It covers a wide range of topics in cybersecurity, which include: Network forensics Threat analysis Vulnerability assessment Visualization Cyber training. In addition, emerging security domains such as the IoT, cloud computing, fog computing, mobile computing, and cyber-social networks are examined. The book first focuses on how big data analytics can be used in different aspects of cybersecurity including network forensics, root-cause analysis, and security training. Next it discusses big data challenges and solutions in such emerging cybersecurity domains as fog computing, IoT, and mobile app security. The book concludes by presenting the tools and datasets for future cybersecurity research.

Fungi are an understudied, biotechnologically valuable group of organisms. Due to their immense range of habitats, and the consequent need to compete against a diverse array of other fungi, bacteria, and animals, fungi have developed numerous survival mechanisms. However, besides their major basic positive role in the cycling of minerals, organic matter and mobilizing insoluble nutrients, fungi have other beneficial impacts: they are considered good sources of food and active agents for a number of industrial processes involving fermentation mechanisms as in the bread, wine and beer industry. A number of fungi also produce biologically important metabolites such as enzymes, vitamins, antibiotics and several products of important pharmaceutical use; still others are involved in the production of single cell proteins. The economic value of these marked positive activities has been estimated as approximating to trillions of US dollars. The unique attributes of fungi thus herald great promise for their application in biotechnology and industry. Since ancient Egyptians mentioned in their medical prescriptions how they can use green molds in curing wounds as the obvious historical uses of penicillin, fungi can be grown with relative ease, making production at scale viable. The search for fungal biodiversity, and the construction of a living fungi collection, both have incredible economic potential in locating organisms with novel industrial uses that will lead to novel products. Fungi have provided the world with penicillin, lovastatin, and other globally significant medicines, and they remain an untapped resource with enormous industrial potential. Volume 1 of Industrially Important Fungi for Sustainable Development provides an overview to understanding fungal diversity from diverse habitats and their industrial application for future sustainability. It encompasses current advanced knowledge of fungal communities and their potential biotechnological applications in industry and allied sectors. The book will be useful to scientists, researchers, and students of microbiology, biotechnology, agriculture, molecular biology, and environmental biology.

A persistent problem when finding communities in large complex networks is the so-called resolution limit. This thesis addresses this issue meticulously, and introduces the important notion of resolution-limit-free. Remarkably, only few methods possess this desirable property, and this thesis puts forward one such method. Moreover, it discusses how to assess whether communities can occur by chance or not. One aspect that is often ignored in this field is treated here: links can also be negative, as in war or conflict. Besides how to incorporate this in community detection, it also examines the dynamics of such negative links, inspired by a sociological theory known as social balance. This has intriguing

connections to the evolution of cooperation, suggesting that for cooperation to emerge, groups often split in two opposing factions. In addition to these theoretical contributions, the thesis also contains an empirical analysis of the effect of trading communities on international conflict, and how communities form in a citation network with positive and negative links.

The book focuses on soft computing and its applications to solve real-world problems in different domains, ranging from medicine and health care, to supply chain management, image processing and cryptanalysis. It includes high-quality papers presented at the International Conference on Soft Computing: Theories and Applications (SoCTA 2018), organized by Dr. B. R. Ambedkar National Institute of Technology, Jalandhar, Punjab, India. Offering significant insights into soft computing for teachers and researchers alike, the book inspires more researchers to work in the field of soft computing.

In recent years, the Dallas Museum of Art has expanded its collection of South Asian art from a small number of Indian temple sculptures to nearly 500 works, including Indian Hindu and Buddhist sculptures, Himalayan Buddhist bronze sculptures and ritual objects, artwork from Southeast Asia, and decorative arts from India's Mughal period. Artworks in the collection have origins from the former Ottoman empire to Java, and architectural pieces suggest the grandeur of buildings in the Indian tradition. This volume details the cultural and artistic significance of more than 140 featured works, which range from Tibetan thangkas and Indian miniature paintings to stone sculptures and bronzes. Relating these works to one another through interconnecting narratives and cross-references, scholars and curators provide a broad cultural history of the region.

An overview of special functions, focusing on the hypergeometric functions and the associated hypergeometric series. Capturing Adriano Garsia's unique perspective on essential topics in algebraic combinatorics, this book consists of selected, classic notes on a number of topics based on lectures held at the University of California, San Diego over the past few decades. The topics presented share a common theme of describing interesting interplays between algebraic topics such as representation theory and elegant structures which are sometimes thought of as being outside the purview of classical combinatorics. The lectures reflect Garsia's inimitable narrative style and his exceptional expository ability. The preface presents the historical viewpoint as well as Garsia's personal insights into the subject matter. The lectures then start with a clear treatment of Alfred Young's construction of the irreducible representations of the symmetric group, seminormal representations and Morphy elements. This is followed by an elegant application of $SL(2)$ representations to algebraic combinatorics. The last two lectures are on heaps, continued fractions and orthogonal polynomials with applications, and finally there is an exposition on the theory of finite fields. The book is aimed at graduate students and researchers in the field.--

This book contains the extended abstracts presented at the 12th International Conference on Power Series and Algebraic Combinatorics (FPSAC '00) that took place at Moscow State University, June 26-30, 2000. These proceedings cover the most recent trends in algebraic and bijective combinatorics, including classical combinatorics, combinatorial computer algebra, combinatorial identities, combinatorics of classical groups, Lie algebra and quantum groups, enumeration, symmetric functions, young tableaux etc...

This is the first book where mathematics and computer science are directly confronted and joined to tackle intricate problems in computer science with deep mathematical approaches. It contains a collection of refereed papers presented at the Colloquium on Mathematics and Computer Science held at the University of Versailles-St-Quentin on September 18-20, 2000. The colloquium was a meeting place for researchers in mathematics and computer science and thus an important opportunity to exchange ideas and points of view, and to present new approaches and new results in the common areas such as algorithms analysis, trees, combinatorics, optimization, performance evaluation and probabilities. The book is intended for a large public in applied mathematics, discrete mathematics and computer science, including researchers, teachers, graduate students and engineers. It provides an overview of the current questions in computer science and related modern mathematical methods. The range of applications is very wide and reaches beyond computer science.

With a foreword by Freeman Dyson, the Oxford Handbook of Random Matrix Theory brings together leading mathematicians and physicists to offer a comprehensive overview of random matrix theory, including a guide to new developments and the diverse range of applications of this approach. In the first part of this book, all modern and classical techniques of solving random matrix models are explored, including orthogonal polynomials, exact replicas or supersymmetry. Further, all main

Nonholonomic Motion Planning grew out of the workshop that took place at the 1991 IEEE International Conference on Robotics and Automation. It consists of contributed chapters representing new developments in this area. Contributors to the book include robotics engineers, nonlinear control experts, differential geometers and applied mathematicians.

Nonholonomic Motion Planning is arranged into three chapter groups: Controllability: one of the key mathematical tools needed to study nonholonomic motion. Motion Planning for Mobile Robots: in this section the papers are focused on problems with nonholonomic velocity constraints as well as constraints on the generalized coordinates. Falling Cats, Space Robots and Gauge Theory: there are numerous connections to be made between symplectic geometry techniques for the study of holonomies in mechanics, gauge theory and control. In this section these connections are discussed using the backdrop of examples drawn from space robots and falling cats reorienting themselves. Nonholonomic Motion Planning can be used either as a reference for researchers working in the areas of robotics, nonlinear control and differential geometry, or as a textbook for a graduate level robotics or nonlinear control course.

The book first describes connections between some basic problems and technics of combinatorics and statistical physics. The discrete mathematics and physics terminology are related to each other. Using the established connections,

some exciting activities in one field are shown from a perspective of the other field. The purpose of the book is to emphasize these interactions as a strong and successful tool. In fact, this attitude has been a strong trend in both research communities recently. It also naturally leads to many open problems, some of which seem to be basic. Hopefully, this book will help making these exciting problems attractive to advanced students and researchers. The first modern treatment of orthogonal polynomials from the viewpoint of special functions is now available in paperback.

This book locates Christine de Pizan's argument that women are virtuous members of the political community within the context of earlier discussions of the relative virtues of men and women. It is the first to explore how women were represented and addressed within medieval discussions of the virtues. It introduces readers to the little studied *Speculum Dominarum* (Mirror of Ladies), a mirror for a princess, compiled for Jeanne of Navarre, which circulated in the courtly milieu that nurtured Christine. Throwing new light on the way in which Medieval women understood the virtues, and were represented by others as virtuous subjects, it positions the ethical ideas of Anne of France, Laura Cereta, Marguerite of Navarre and the Dames de la Roche within an evolving discourse on the virtues that is marked by the transition from Medieval to Renaissance thought. *Virtue Ethics for Women 1250-1500* will be of interest to those studying virtue ethics, the history of women's ideas and Medieval and Renaissance thought in general.

This biography reconstructs the life of the second wife of Henry VIII, drawing on scholarly studies and critical analysis to define an English queen who has been alternately viewed as a whore, martyr, feminist icon and cautionary tale over the centuries.

Chaetomium genus was established by Gustav Kunze in 1817. According to Index Fungorum Partnership, there are 273 *Chaetomium* species accepted till now. Members of the genus *Chaetomium* are capable of colonizing various substrates and are well-known for their ability to degrade cellulose and to produce a variety of bioactive metabolites. More than 200 compounds have been reported from this genus. A huge number of new and bioactive secondary metabolites associated with unique and diverse structural types, such as chaetoglobosins, epipolythiodioxopiperazines, azaphilones, depsidones, xanthones, anthraquinones, chromones, and steroids, have been isolated and identified. Many of the compounds have been reported to possess significant biological activities, such as antitumor, antimalarial, cytotoxic, enzyme inhibitory, antimicrobial, phytotoxic, antirheumatoid and other activities. *Chaetomium* taxa are frequently reported to be cellulase and ligninase producers with the ability to degrade cellulosic and woody materials. This is the first, comprehensive volume covering *Chaetomium* genus in detail. It includes the latest research, methods, and applications, and was written by scholars working directly in the field. The book also contains informative illustrations and is fully referenced for further reading.

The positive response to the publication of Blanton's English translations of Euler's "Introduction to Analysis of the Infinite" confirmed the relevance of this 240 year old work and encouraged Blanton to translate Euler's "Foundations of Differential Calculus" as well. The current book constitutes just the first 9 out of 27 chapters. The remaining chapters will be published at a later time. With this new translation, Euler's thoughts will not only be more accessible but more widely enjoyed by the mathematical community.

The ideological underpinnings of early modern theories of contagion are dissected in this volume by an integrated team of literary scholars, cultural historians, historians of medicine and art historians. Even today, the spread of disease inspires moralizing discourse and the ostracism of groups thought responsible for contagion; the fear of illness and the desire to make sense of it are demonstrated in the current preoccupation with HIV, SARS, 'mad cow' disease, West Nile virus and avian flu, to cite but a few contemporary examples. *Imagining Contagion in Early Modern Europe* explores the nature of understanding when humanity is faced with threats to its well-being, if not to its very survival.

This book is the result of nearly fifteen years of work on developing analytic machinery to recover, as effectively as possible, asymptotics of the coefficients of a multivariate generating function. It is the first book to describe many of the results and techniques necessary to estimate coefficients of generating functions in more than one variable.

For any researcher working in representation theory, algebraic or arithmetic geometry.

Women have engaged in healing from the beginning of history, often within the context of the home. This book studies the role, contributions and challenges faced by women healers in France, Spain, Italy and England, including medical practice among women in the Jewish and Muslim communities, from the later Middle Ages to approximately 1800.

One of the most authoritative and comprehensive books on the subject of continued fractions, this monograph has been widely used by generations of mathematicians and their students. Dr. Hubert Stanley Wall presents a unified theory correlating certain parts and applications of the subject within a larger analytic structure. Prerequisites include a first course in function theory and knowledge of the elementary properties of linear transformations in the complex plane. Some background in number theory, real analysis, and complex analysis may also prove helpful. The two-part treatment begins with an exploration of convergence theory, addressing continued fractions as products of linear fractional transformations, convergence theorems, and the theory of positive definite continued fractions, as well as other topics. The second part, focusing on function theory, covers the theory of equations, matrix theory of continued fractions, bounded analytic functions, and many additional subjects.

In the 100 years since the founding of the AMS, the American mathematical community has grown from a small group heavily dependent on European mathematicians to a large and influential group that in many areas sets the standard for the rest of the world. By the 1930s, there was a flourishing mathematical community to welcome the influx of mathematicians fleeing Europe. This volume, the first in the *History of Mathematics* series, brings together a variety of perspectives on the political, social, and mathematical forces that have shaped the American mathematical community in the past century.

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